

# PROJECT facts

U.S. DEPARTMENT OF ENERGY  
OFFICE OF FOSSIL ENERGY  
NATIONAL ENERGY TECHNOLOGY LABORATORY



## CONTACT

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## PARTICIPANT

**Great River Energy (GRE)**

Underwood, ND

## LOCATION

**GRE's Coal Creek Station**

Underwood, McLean County, ND

## TOTAL ESTIMATED COST

\$25,640,166

## COST SHARE

DOE \$11,000,000

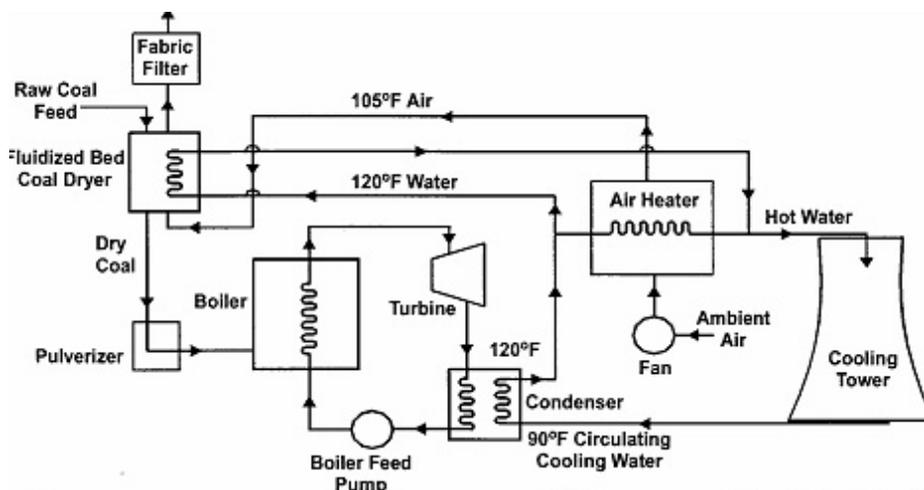
Participant \$14,640,166



## INCREASING POWER PLANT EFFICIENCY — LIGNITE FUEL ENHANCEMENT

### Project Description

Great River Energy, the prime participant in this demonstration project, is collaborating with EPRI; Lehigh University; Barr Engineering, a Minneapolis, Minnesota firm with expertise in lignite and coal handling; and Falkirk Mining and Couteau Properties, the lignite coal supplier. The objective of this project is to demonstrate moisture reduction of lignite coal, thereby increasing its value as a fuel in power plants. The project will be conducted at the Great River Energy's Coal Creek Station in Underwood, North Dakota. The demonstration activities will focus on using waste heat in the plant to lower the moisture content of lignite, typically about 40%. A phased implementation is planned; in the first phase, a full-scale prototype dryer module will be designed to supply one-sixth of dry coal required for a 546 MW unit at the Coal Creek Station. Following successful demonstration of the prototype dryer, in the second phase, Great River Energy will design, construct, and perform full-scale long-term operational testing on a complete set of dryer modules needed for full power operation of one 546 MW unit. Coal will be dried to a number of different moisture levels. The effect of coal drying on plant performance will be measured and optimum-operating conditions will be determined. The following figure depicts how the coal drying system will be integrated into the existing Coal Creek Station:



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## ADDITIONAL TEAM MEMBERS

**Electric Power Research Institute (EPRI)**  
(collaborator)

**Lehigh University**  
(collaborator)

**Barr Engineering**  
(lignite and coal handling)

**Falkirk Mining and Couteau Properties**  
(lignite coal supplier)

## ESTIMATED PROJECT DURATION

48 months

## CUSTOMER SERVICE

800-553-7681

## WEBSITE

[www.netl.doe.gov](http://www.netl.doe.gov)

## Benefits

This project offers a creative approach for using low-value, waste heat normally available in power plants, to increase the plant efficiency, reduce pollution, and improve economics. When demonstrated, this technology could be applied to increase the generating capacity, efficiency, and cost-effectiveness of units that burn high-moisture coal. Currently in the U.S., units totaling more than 100 GW installed capacity are burning coal with inherently high moisture content. Application of this technology could result in a reduction in the emissions from coal-fired power plants because the plants will require less coal after it is dried to produce the same amount of power. In this project, the moisture in the lignite would be lowered by about ten percentage points. This is estimated to yield a 2.8%-5% efficiency improvement (or heat rate reduction) with an attendant benefit of reduced SO<sub>2</sub>, mercury, carbon dioxide, nitrogen oxides, and ash emissions per unit electricity output. This technology increases the efficiency of plants burning lignite, Powder River Basin coals, and other high moisture coals.



*Coal Creek Station*